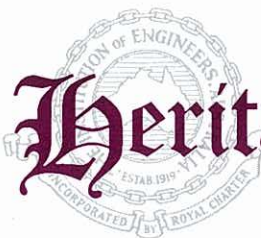


Engineering Heritage Australia



Newsletter of the National Committee on Engineering Heritage
The Institution of Engineers, Australia

No. 5

March 1996

Planning for the next Heritage Conference to be held in Newcastle from 29 September - 2 October 1996 is well underway and an interesting programme of both technical and social events is being planned.

Some 30 papers have been accepted from authors from around Australia, New Zealand, Japan and the United Kingdom, and of course, our keynote speaker Professor Emory Kemp is from the USA. The topics are varied and involve both the people and the technology that will *Shape our Future*.

ENGINEERING HERITAGE



The pre-conference tour will commence in Sydney on 26 September, and will wind up in Newcastle on Sunday afternoon, 29 September. To whet your appetite, we will visit the Sydney Maritime Museum, the Zig Zag Railway, Jenolan Caves, the Lithgow State Mine Heritage Park, Walka Water Works and a Hunter Valley winery.

While attending the Conference, which will be held at the David Madison Building in Newcastle, delegates will also visit historic Fort Scratchley and the Richmond Main Colliery Park.

So mark this Conference in your diary and if you have not already done so, fax us your information for a registration brochure. Any queries can be directed to the Newcastle Division office of IEAust on Tele: (049) 264 440 or Fax: (049) 297 121.

NEW LISTINGS OF ENGINEERING HERITAGE ITEMS

The Register of the National Estate

Wonthaggi State Coal Mine

Nine former black coal mining sites, known as the Wonthaggi State Coal Mine, on the State Coal Mine Historic Reserve in Victoria, have been placed on the Interim List. The mine closed in 1968 after almost 60 years of operation and is an important part of Australia's industrial history. It is believed to have been the first fully electrified coal mine in the country.

Atherton-Ravenshoe Railway

An outstanding example of railway engineering in Australia, the Atherton-Ravenshoe Railway is now on the Interim List of the Register of the National Estate.

The railway, built from 1905 to 1915, skirts some of the most picturesque parts of Northern Queensland and the line has many original railway structures which are now uncommon, such as a number of timber trestle bridges. A group called Railco is currently restoring the line to its former glory.

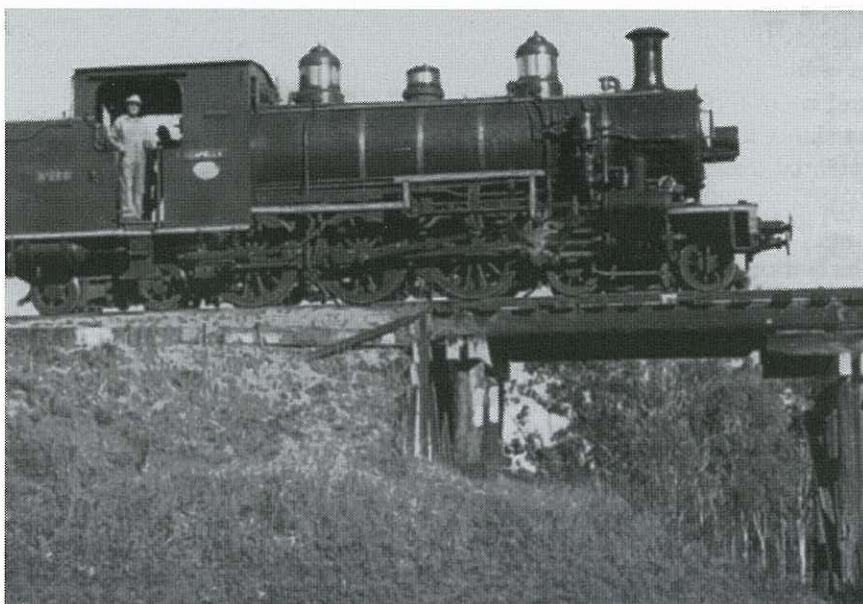
The railway, when fully restored, will provide one of the best ways to experience the western edge of World Heritage-listed rainforests in Queensland.

South Australian Register

Under the SA Heritage Act 1993 the following places with engineering heritage significance have been entered into the "State Heritage Register" in 1995 (as at May 1995).

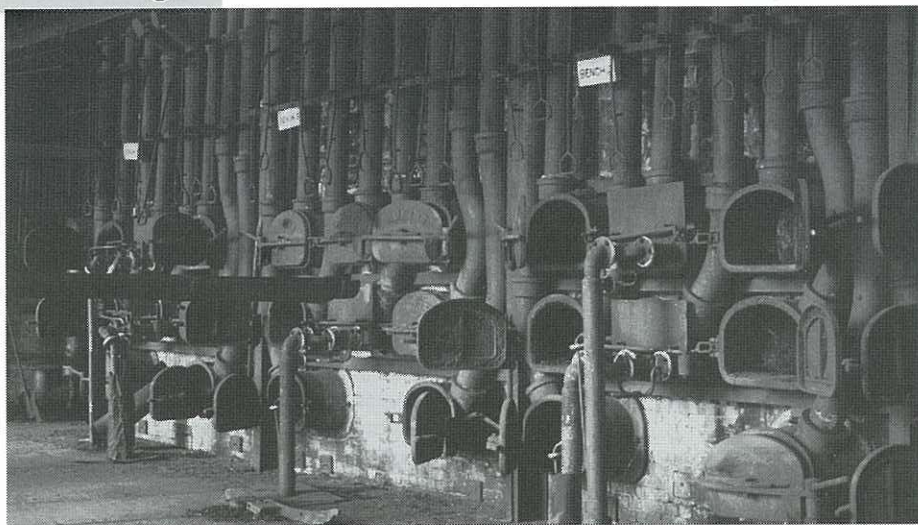
- Deep Creek Bridge, Basket Cable
- Poruler Gold Mine, Castallbul
- Islington Railway Workshops, Kilburn
- Brick Kilns and Chimneys, Beverley
- A Manning House (prefabricated circa 1880's) Maranaga
- Silicide Bridge and Telegraph Line, Wahlerie
- Dunn's Bridge, Balaklava
- Silent Cop, Balaklava
- Lowly Point Light House Complex, Lowly Point

Any news from other States?



The Capella Engine on Atherton-Ravenshoe Railway

Bendigo Gasworks Awarded Historic Engineering Marker



On 21 September 1995, the President of the Institution of Engineers Australia, Dr Ian Mair unveiled an Historic Engineering Marker at the Bendigo Gasworks.

Following the discovery of gold, Bendigo quickly grew into a thriving provincial centre. The gasworks were built before the railway from Melbourne, so all construction materials and black coal had to be hauled in by horses.

The gasworks and reticulation system was re-furbished in the 1920s to improve the efficiency of the plant and the quality of the gas. By the 1930s the quality of gas was su-

perior to that in Britain. The gasworks were purchased by the Gas and Fuel Corporation in 1958 and in 1966 two of the horizontal retorts were altered to allow catalytic conversion of Liquefied Petroleum Gas to increase the supply. When natural gas arrived in Bendigo in August 1973, it spelt the end of production at the Bendigo Gas Works.

On 8 October 1973 the retort was charged with black coal for the last time, the conversion to natural gas having been completed.

In unveiling the Historic Engineering Marker, Dr Mair noted that the historic plant is sufficiently complete to enable the process of gas-making

to be easily understood. The sequence of development of the gasworks from the 1860s to the 1960s is also apparent in the range of buildings and equipment. The plant includes, horizontal retorts, condensers, gas holders, boilers, manager's office and residence, stables, blacksmith shop, coal and clinker handling equipment.

The gasworks was purchased by the Bendigo Trust and is being developed as a Gasworks Museum. The Bendigo Trust also proudly displays the many specialised hand tools used on the site. The Trust also runs the Bendigo Tourist Tram and part of the site now functions as a tram depot.

The Historic Engineering Marker reads as follows:

Coal Gas was manufactured here from 1860 to 1973. The original works were constructed during 1859-1860 under the direction of Engineer Alexander K Smith and developed in a period of growth by W A Simco, General Manager 1922-1939. The works were operated by the Bendigo Gas Company until purchased by the Gas and Fuel Corporation in 1958 at which time they were supplying 3500 consumers. The site is an internationally significant example of an entire provincial Gasworks.

Dedicated by The Institution of Engineers, Australia and the Bendigo Trust, 1995.

Forth Rail Bridge

The Forth Rail Bridge was in the news in February and March as a result of the simmering row over the condition of the structure since Railtrack took it over in April 1994. However, the problem has a much longer history for since the Health and Safety at Work Act of 1974, ex-Royal Navy riggers are no longer allowed to dangle in bosun's chairs at 100m or more above the dangerous waters of the Firth.

Since then modern abseiling techniques have been used to some extent, but to apply most of the 17t of new paint required by the bridge every year, expensive conventional scaffolding is needed and almost 40% of the current painting cost is down to access provision. (*Edinburgh Evening News*, 31 January 1995, *NCE*, 16, 23 February and 2 March).

'A stitch in time saves nine' is a well-known principle for the guidance of managers of bridge maintenance. In this case the break in the flow of work caused by the introduction of the 1974 Act is being remedied by applying a modern painting system with a projected life of 25 years rather than the previous five year life, but there appears to be a great deal to make up and the need for extra funding to maintain appearances is an argument that is not going to go away, especially in a time of financial stringency for Railtrack.

Randell's Graving Dock

The South Australian Heritage branch, in association with the Flinders University Archaeology Society, conducted excavations at the site of Randell's Graving Dock in Mannum as part of the project to restore the paddle steamer *Marion*.

The dock, built in 1873 as a floating dry dock, was later installed in the bank of the River Mannum where it serviced many of the steamers on the river. Excavations were directed at establishing the extent of the dock and at locating associated work sheds on the bank beside it. (*From ASHA Newsletter*).

Duck Reach Power Station Rehabilitation

Duck Reach, owned and operated by the Launceston Council Electricity Department, was the first public hydro-electric power station in Australia and operated for 60 years until the development of the Trevallyn power scheme. Built in 1895, it is situated on the south bank of the South Esk river close to Launceston City. Water was supplied by diverting the flow of the South Esk via a 850 metre long tunnel. The original building was bluestone and the machinery was transported down the south bank. A suspension bridge was erected across the Cataract Gorge in 1896, and an aerial ropeway and machinery shed was constructed in 1903. Employee cottages were erected on the south side of the river.

Siemens won the contract to supply and erect the electrical equipment and the station commenced operation on 10 December 1895 with five times 21 horsepower Gilkes turbines driving Siemens generators. Launceston was the first Australian city to be illuminated with hydro-electricity. Additional plant was installed in 1899, 1906, 1919 and 1921 to give a maximum output of 2.2MW.

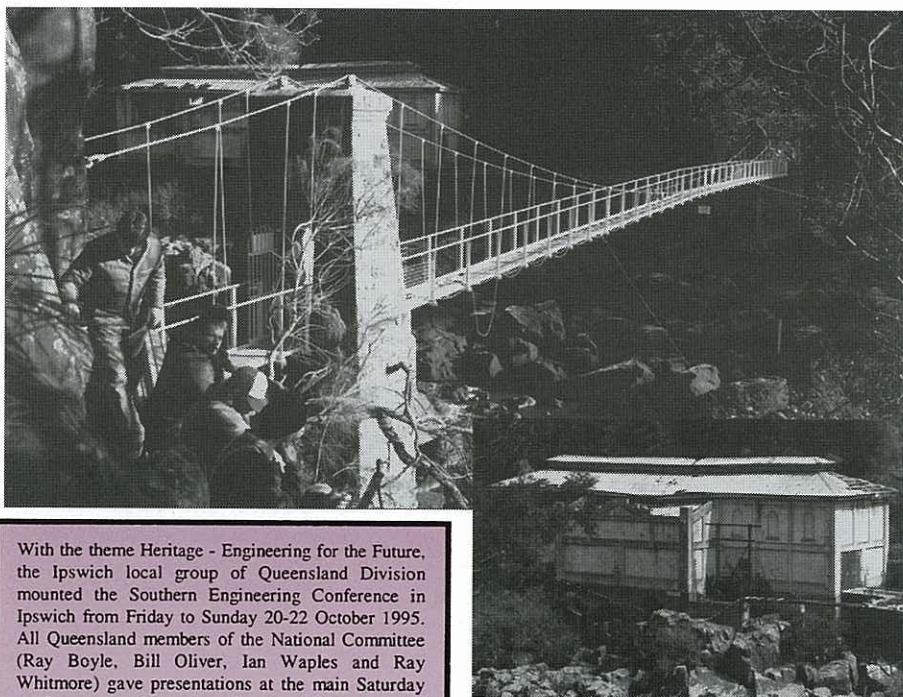
The original bluestone building was destroyed in a major flood in 1929. The machinery remained intact and the building was replaced in reinforced concrete in 1930. The suspension bridge was repaired by two prominent Launceston businesses, J and T Gunn (pylons) and Salisbury Foundry (deck).

The station began to supply electricity to the Hydro-Electric Commission in 1923 and the Commission took over the power station in 1944. It was taken out of service in 1955 and site ownership reverted to the City. By 1957 the buildings and suspension bridge were stripped and the machinery was removed. The tunnel intake, some penstocks, power station building, and residences remained.

The site is currently being rehabilitated to commemorate the centenary of the commencement of power generation from Duck Reach.

The work of rebuilding the access suspension bridge, the refurbishment of the power station building including the return of an original generator set is being carried out in accordance with the recommendations of a Conservation Plan prepared by Godden Mackay.

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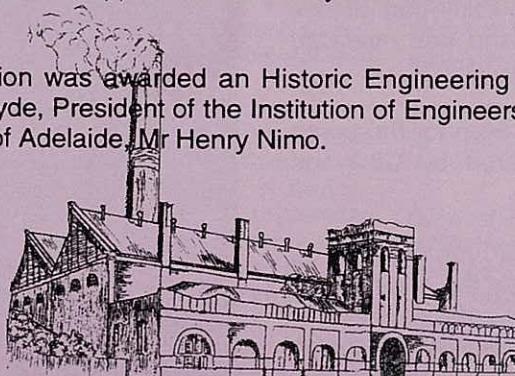
With the theme Heritage - Engineering for the Future, the Ipswich local group of Queensland Division mounted the Southern Engineering Conference in Ipswich from Friday to Sunday 20-22 October 1995. All Queensland members of the National Committee (Ray Boyle, Bill Oliver, Ian Waples and Ray Whitmore) gave presentations at the main Saturday conference session. Associated activities included inspection of the vast North Ipswich Railway Workshops, and a visit to RAAF Amberley Air Base to inspect progress on the Boston bomber restoration project.

Historic Marker for Grenfell Street Power Station in Adelaide

The Grenfell Street Power and East Terrace Converter Stations mark the site from which The South Australia Electric Light and Motive Power Company generated the first public electricity supply to light the City of Adelaide.

The company, which was incorporated in 1895 was succeeded by the Adelaide Electric Supply Company (1904-1946) and then ETSA. The power and converter stations also supplied the electricity for Adelaide's electric tramway system.

The Power Station was awarded an Historic Engineering Marker in April 1995 by Prof. Clyde, President of the Institution of Engineers, Australia, and the Lord Mayor of Adelaide, Mr Henry Nimo.



Craven Crane to be Conserved - but Help Needed

The Honeysuckle Development Corporation is a New South Wales Government instrumentality charged with the re-development of Government land on the southern shore of Newcastle Harbour (itself a National Engineering Landmark). Among the buildings that have been preserved in the re-development are the former Honeysuckle Point Railway Workshops.

The former Boiler Shop at the workshops contains a rope driven, 16 ton portal crane in almost original condition. A continuous rope drive runs the length of the workshop and all motions of the crane are powered from this drive by systems of clutched auxiliary drives operated from a control cabin. In a letter to the Institution in August 1995, the Honeysuckle Development Corporation advised that it intended to undertake the restoration of the crane.

The crane specification is:

- Built by Craven Brothers, Manchester, 1885
- Situated in former boiler house of the Honeysuckle Point Railway Workshops, Newcastle
- Travelling beam, 35 feet (10.7m) span between rails
- Clear height 6.5m
- Longitudinal travel 45m
- Nominal load capacity 16 tons.

All the rope drive mechanism is still intact with only minor damage; the only major alteration which appears to have been made is the replacement of the original power source, believed to be steam, with an electric motor in the early part of this century. The crane was operated as recently as the 1950's.

A Conservation Plan for the crane has been prepared by Carl and Margaret Doring.

Some mysteries remain to be solved, particularly the original motive power of the crane. A similar crane erected in Sydney at the time was powered by a wall-mounted

"Tangye" two cylinder steam engine; however, no mounting holes for a similar engine have been found at Newcastle.

Information Needed

Assistance has been sought from the Newcomen Society and if Australian readers have information which might be useful in the conservation it would be very welcome.

In particular we are interested in:

- The relative rarity of the crane, including references to other, similar ones - there is none other intact in Australia;
- Any archival records which may assist its 'conservation' and restoration;
- Any data on the power requirements.

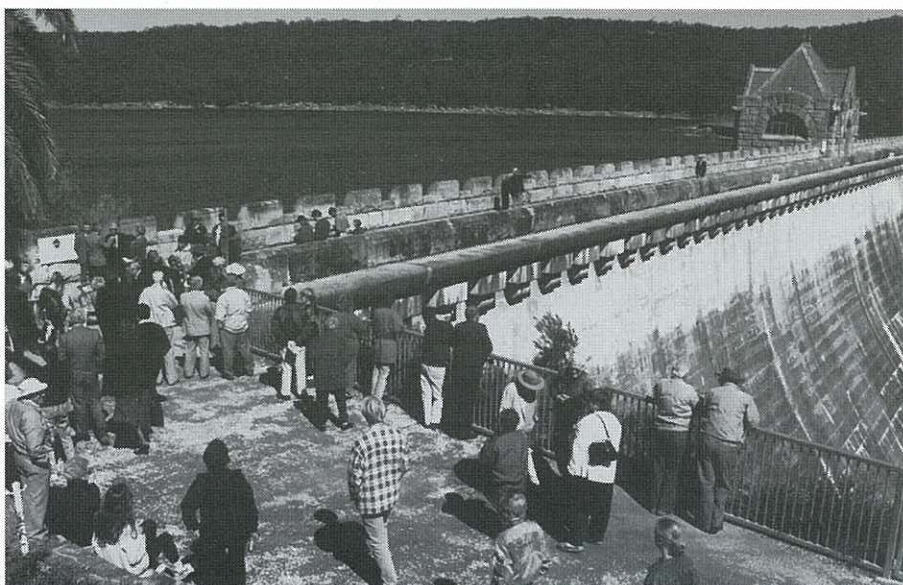
Contact Bill Jordan on (049) 294 841 if you can help.

Cataract Dam a National Engineering Landmark

On 9 April 1995 at the conclusion of Heritage Week, a National Engineering Landmark plaque was unveiled on Sydney's Cataract Dam in the Upper Nepean Catchment Area. It was a perfect sunny Sunday with in excess of 100 people attending. The official party included John McMurtrie, Chairman of Sydney Water; Paul Hagenbach, Chairman of the National Committee on Engineering Heritage and the Hon Justice Barry O'Keefe, President of the National Trust (NSW). Interstate members of the National Committee who had arrived in Canberra for a meeting the next day, came up for the occasion and there was a broad representation of interest in the event.

Cataract Dam, completed in 1907, was Sydney's first major water storage in the catchment area and set a standard for other capital cities. A feature of its construction was the use of large sandstone blocks set in concrete mortar, a technique known as cyclopean masonry.

After the ceremony, Sydney Water provided refreshments, opened its site museum, organised tours of the Federation Manor House, and its staff took visitors on conducted tours of the dam, valve house and the modern post tensioned anchorages that stabilise the dam wall against extreme floods. Compliments are extended to all who contributed to the success of the day.



Old Hay Sewerage Treatment Works

At the end of last century a design was prepared for a sewerage reticulation and treatment system for the Town of Hay which had, at that time, a population of about 3,000. The design provided for about seven kilometres of reticulation main, seven ejector type pumping stations operated by compressed air, and a large septic tank type treatment works.

Construction took a number of years and the system, commissioned in 1905, became the first operational sewerage system in country New South Wales.

In the early 1950's the reticulation was re-routed and sewage diverted to a new trickling filter treatment plant, constructed during the war to treat effluent from a number of internment camps. Both the ejector stations and the septic tanks were decommissioned.

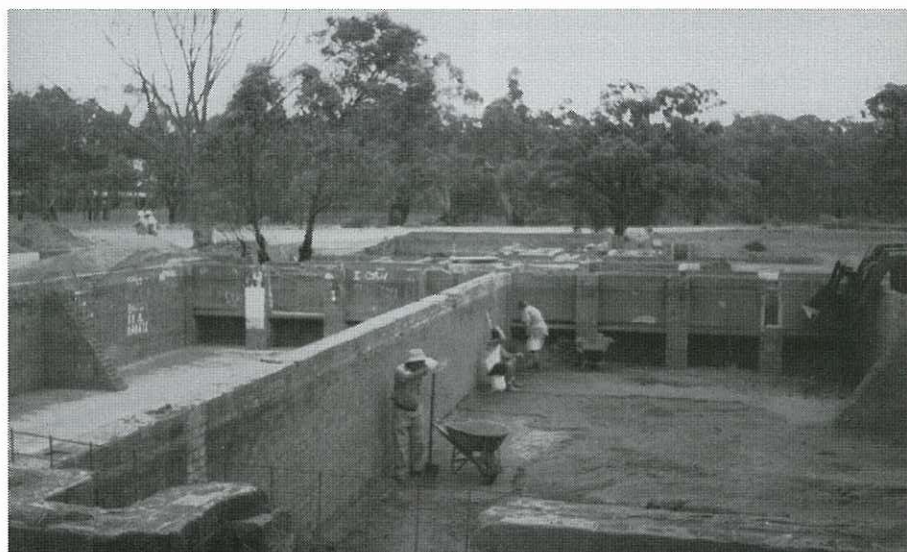
The septic tank treatment plant has fallen into disrepair with the tiled roof over the tanks having completely disappeared and a lot of the brickwork and filter bed material having been removed and disposed of.

At the end of 1994 Hay Shire Council embarked on restoring, as far as was economic and practical, the remains of the treatment plant.

To date, using funding for New Works Opportunities employees (Council was the first in the Riverina to access such fundings), grants from the New South Wales Heritage Branch, Department of Planning, and the Department of Public Works, Council has cleared the site of all foreign material (including many tonnes of clay which had apparently been dumped into the septic tanks to render them safe), re-

cover, screen and replace some of the lost filter bed material, restore the earthen buttresses that were part of the original design and carry out some minor restoration of parts of the brick work. The site has been fenced and made safe to prevent further degradation of the remaining works.

As funding becomes available, Council intends to undertake further restoration of the structural components, provide interpretative signage and develop a tourist walk through the works.



People as Heritage

We take for granted hearing the voices of singers and actors long since dead. We may get excited and nostalgic to hear again, leaders like Winston Churchill and John Curtin deliver their famous speeches. But we rarely contemplate the possibility of hearing the voices of the people who were involved in important technological changes and landmark engineering projects.

If we consider the events of the last say 50 years, men and women now 60 years and older, have been involved in the greatest technological and social changes the world has ever experienced. Many Members of the Institution are in

this category, and within them lies a wealth of knowledge, experience and accomplishment. This must be preserved for posterity as part of our national heritage - we can do this through oral history.

In the process we capture first hand experience of changes in social attitudes, in technology and methodology; why they occurred and who was responsible. The tapes produced contribute to a valuable data base of both engineering and social history.

The Engineering Heritage Committee of Sydney Division has an active Oral History Programme, which so far has produced close to 120 tapes, recording the rich and valuable

experiences of close to 60 eminent engineers.

To ensure the material will be preserved for posterity and be readily accessible to historians, biographers, journalists, genealogists and other researchers, the Committee has established "The Institution of Engineers, Sydney, Oral History Collection" at the State Library of New South Wales.

The first installment of tapes was presented by Sydney Division President, Stephen Branch, to the State Librarian Ms Dagmar Schmidmaier on 16 November. It comprised eight albums containing 96 tapes of the experiences of 45 engineers who have played a major role in the development of our

Nation. The albums include associated biographical material and release documents.

Copies of the biographical material have been placed on personal files in the Institution's National Office and a copy of the Register of interviews has been provided to the National Library of Australia, Royal Australian Historical Society, Society of Australian Genealogists and professional associations of historians and similar bodies.

More information can be obtained from Michael Clarke, 41 Portland Street, Endfield NSW 2136, telephone/fax: (02) 745 3752.

Bridges Down Under

This is the title of a fascinating new book by Dr Don Fraser, launched on 25 September by John Brew, former Chief Executive of the State Rail Authority of New South Wales. "Fascinating", because it tells the history of New South Wales railway bridges (those that directly support the track) "against the dynamic backdrop of contemporary politics, economic conditions, railway administrations, the influence of engineers, community attitudes, as well as technological changes during the 140 year period from 1855". Many will find this social and political context an invaluable aid in understanding the reasons behind other developments in the State during the same period, and why things are like they are.

The book has been extremely well researched, is well and appropriately illustrated, with the images where they are needed ie. adjacent to the related text, and it has an excellent glossary. The author shows consideration for lay readers by patiently interpreting engineering complexities to them. However, his style is not condescending.

Not only is *Bridges Down Under* interesting reading, but it is an important additional reference on railways and railway bridges in New South Wales. The book is available in soft cover at \$34.95 from the Australian Railway Historical Society, 67 Renwick Street, Redfern NSW 2016, telephone (02) 699 1714.

A Historic Engineering Marker plaque was set on the wall of the pump house at Cairncross Dock at a ceremony on 3 August 1995. It was part of the larger ceremony for the reopening of the 50 year old dockyard after a seven year period of closure. The very large gathering saw the plaque unveiled by the Premier of Queensland, the Right Honourable Wayne Goss.

Plaquings proposed for 1996 are Enoggera and Gold Creek Dams in Brisbane, and the Lamington Bridge at Maryborough.

The Victorian Engineering Heritage Branch have produced guide notes for two Engineering Heritage Tours of Geelong. One is a 20 minutes tour heading into Geelong from the North, while the second may take four hours and covers Geelong proper. For notes and information call (03) 9329 8188.

Queensland Division Archives

A consultant has been briefed to examine Queensland Division's archives and recommend appropriate archival procedures. The brief was developed following close examination of the 1988 archives by Division Members Jim Goldstein, Bill Patterson and Dr Norm Sheridan.

Launceston Railway Workshops Saved

Good news for the future direction of the Launceston railway workshops. The site is being redeveloped as a project of the Commonwealth's Building Better Cities Programme.

Launceston City Council has unanimously decided to commit \$3 million to the future development of the Queen Victoria Museum and Art Gallery on the old railway workshops site. The Council's decision was on condition that the land and buildings for the Museum would be given free by the Tasmanian Government, and that the University of Tasmania would relocate its schools of Visual and

Performing Arts to the site. The third party expected to operate from the site will be the Royal Show Society.

The museum, currently operating from five sites, will now concentrate its operations onto two sites, the existing museum in Wellington Street and the railway workshops. The Museum envisages a role in interpreting the heritage significance of the whole site (focussing on such aspects as the intact blacksmith's workshop), as well as having an ideal opportunity to provide greater access to its own significant collections in the 26 large buildings. The first stage will be new conservation laboratories and workshops

for the Museum. Relocating the Art Gallery, with suitable climate-controlled facilities, has been made possible by a commitment for a further \$4 million from the State Government.

The whole process will be phased in over a number of years. It promises further recognition of Launceston's rich heritage.

Collecting Contemporary Technology

The collection of contemporary information and artefacts is seen to be an important function of modern heritage organisations, whose purpose is to preserve and study cultural history. However, they invariably find their time is wholly occupied with managing heritage matters relating to past eras. As a consequence, the background to technological developments having a significant influence on a society's cultural development has often been lost or dispersed in the interim, and may be impossible to recover. Artefacts may thus be left unsupported by any information on their provenance ie. the origins of the idea; the design, development and marketing processes that were used; and the names and backgrounds of the people involved.

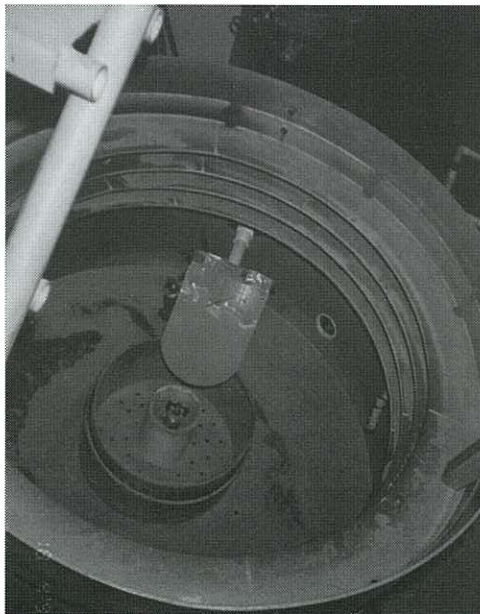
The Technology Division of the History Trust of South Australia, in conjunction with the Department of Mechanical Engineering at Adelaide University, has initiated (in March 1995) a pilot study to develop a format and procedure for the collection of contemporary technology in South Australia. The study is being conducted by Ms Josephine Barker as part of her final year Honours programme.

The aim is to develop a framework for the selection of, and the collection of information about, contemporary engineering activity that seems likely to have a significant impact on the development of the South Australia, while the information trail is still warm.

The final report will deal with the criteria used to select developments for collection, the structure of the database used to record relevant information, the processes used to collect information, and a number of case studies.

Organisations participating in the pilot study are MFP Australia, the Australian Submarine Corporation, Hardie Irrigation Pty Limited, Rooftop Clothing, Casual Systems, and postgraduate students at the

University of Adelaide investigating active noise control.



The illustration shows a test rig at Hardie Irrigation used to test new sprinkler head designs in dusty conditions.

Industrial History of Western Australia

The Western Australian Division of The Institution has launched *Industry and Infrastructure of Western Australia 1829-1940*. The book by Richard Hartley, a Member of the Division's Engineering Heritage Panel, includes tables and maps to illustrate the text. It is available from WA Division Office, 712 Murray Street, West Perth, WA 6025, @ \$25 plus \$5 postage.

Main Roads Heritage Strategy

Consultants Dr Leigh Edmonds* (University of WA) and Fiona Bush, with the assistance of Dr Jenny Gregory (Centre for WA History), in association with the National Trust (WA) have recently completed a heritage strategy for Main Roads Western Australia.

In a well structured report the authors explain the existing heritage legislation and community expectations regarding heritage and make recommendations about the development of a heritage strategy for Main Roads. Their report recommends that Main Roads go beyond mere compliance with current heritage legislation and practice (ie. reactive procedure), and develops policies to identify and manage its own places of heritage significance (proactive policy). The report suggests a range of procedures for adoption. It concludes that by following this path Main Roads would preserve an important part of Western Australia's heritage and enrich itself by encouraging greater customer understanding of its past and current functions.

The draft heritage strategy is currently before the Main Road's Executive for consideration.

The report is an important one because the authors believe that to date there has not been any similar strategy developed for any Government instrumentality or private company in Australia (*The authors in WA would be very interested to hear any claims to the contrary. Notwithstanding this, Main Roads Western Australia are to be commended on taking this significant initiative - Ed*).

* Dr Edmonds is also author of a history of Main Roads Western Australia due to be published later this year.

Engineering History Paper Produces an Historic Connection

Volume GE18, No 2, 1994 of the Multi-Disciplinary Transactions contains the paper titled "Curved-tracked bascule bridges in New South Wales and their relationship to the cardioid" jointly authored by Michael Deakin, an applied mathematician at Monash University and Don Fraser, engineering historian and specialist in the history of bridges. The paper deals with a particular type of bascule bridge in which the counterweights, in the form of large rollers, move along a curved track thereby giving smooth operation of the movable span during all stages of operation. Dr Deakin showed that the correct mathematical definition of the curve is a cardioid and Don Fraser's research showed that prominent New South Wales Public Works Engineer, Harvey Dare, not only introduced this American-cum-French design into New South Wales but took the practical step to fitting four circular arcs to closely match the theoretical curve.

Harvey Dare, despite his significant contribution to bridge and dam engineering in the early years of this century and becoming Commissioner of the Water Conservation and Irrigation Commission (NSW) 1916-1935, and his involvement with the Institution of Engineers, was a quiet achiever, unlike his contemporary JJC Bradfield. Consequently, not a great deal was known about him apart from some basics from Government records.

But all that changed when Michael Deakin gave a talk about his work, the bascule bridges and Harvey Dare on the ABC's programme "Okham's Razor". A regular listener to the programme was Valerie Chapman, a grand-daughter of Harvey Dare, living in Sydney, Don Fraser's home town. After contact through Michael, Valerie and Don met for a very fruitful exchange of information about Harvey Dare, including a family copy of his unpublished autobiography.

The moral of this story for historians of any discipline is that no file is ever closed. The information being sought is somewhere out there but it often requires a large element of luck to uncover it.



Valerie Chapman and Don Fraser

The Historic American Engineering Record - 25 Years of Documenting Engineering Heritage

Recording and documenting surviving industrial heritage provides the foundation for informed decisions regarding the preservation and re-use of industrial and engineering fabric.

The Historic American Engineering Record (HAER) was established in 1969. The work was initially based upon the National Historic Sites Act (1935) which established the documentation mandate, resulting in a national archive of America's architectural, historical and cultural achievement. More recently the National Historic Preservation Act (1966) charged Federal agencies with the responsibility for their historic properties and established a Federal-State partnership to create:

- A national register of historic places.
- A historic preservation grants programme.
- A national archaeological programme.
- An information distribution mechanism.
- A Presidential advisory Council on historic preservation.

It also provided the means for funds to encourage preservation activities in the private sector. With specific reference to industrial heritage, it mandated documentation to the Historic American Buildings Survey (HABS) and to HAER. This mandate has resulted in a steady flow of documentation of the HAER collection, primarily of sites, structures and objects often of state and local interest.

Nearly 4,000 sites have been recorded. There are c.35,000 photographs, nearly 30,000 data pages, and approaching 4,000 measured and interpreting drawings. Several thousand people have been involved in the work. The somewhat pedantic process of documentation has proved to be a powerful tool in developing a national awareness and understanding of industrial heritage and has brought to the fore hitherto forgotten contributions of industrialists, entrepreneurs and engineers. It has greatly contributed to the significance and meaning of the industrial workplace, and its setting in the vast panoply of American History. HAER was figuratively characterised as a 'treasure chest' of industrial history and as a 'national memory' with its component records forming 'the grey cells'. It has unquestionably provided a sound foundation for informing opinion in respect of preservation and conservation issues. *(Condensed from ICE Newsletter).*